

this is supplemented by an account of work done in the petrographical and palaeontological departments of the Survey. The field record is arranged stratigraphically, beginning with the pre-Cambrian rocks and ending with the recent deposits. Thus there are notes on nearly all the main geological systems, excepting only the Cambrian, Permian, and some of the Tertiary divisions.

In the accounts of Highland regions we find many references to the complex folds, the faults and thrust planes, which have affected the Lewisian gneiss, the schists of the "Moine series," the Torridonian and other rocks. In some cases highly altered rocks are found to overlie others which are less altered, showing that the metamorphism must have taken place before the rocks occupied their present relative positions. In places the Moine rocks contain intrusions of partially foliated hornblende rocks, and some of these are foliated parallel to their sides and cut both the banding and the foliation of the rocks in which they occur.

It seems probable that the Moine schists of the north-west pass into and form part of the Dalradian series of the central Highlands. It is also considered probable that the Moine schists acquired their present crystalline characters since Cambrian times. Moreover, from the fact that the phyllites, quartzites, grits, conglomerates and limestones which extend from the shores of Elgin, Banff and Aberdeen to those of Islay and Jura have had a sedimentary origin, it is thought that they may yet find a definite place among pre-Cambrian or even post-Cambrian formations. In connection with this subject it is to be remembered that a belt of rocks, possibly of Arenig age, has been traced at intervals from Kincardineshire to Dumbartonshire. Here the rocks are wedged in along a line of disturbance between the Highland schists and the Old Red Sandstone; and they comprise graphitic shales, schists and cherts with Radiolaria. Rocks of this character have now been discovered in Arran.

Another interesting discovery is chronicled in the account of the work among the Silurian rocks of Ireland. The majority of the igneous rocks of the Waterford coast have been regarded as volcanic sheets intercalated contemporaneously among the Lower Silurian sediments. Evidence is now brought forward to show that these rocks, which were believed to be tufts and agglomerates, are intrusive, the "agglomerates" having been in reality produced by a process of brecciation during a prolonged period of igneous intrusion.

It has been pointed out in a previous issue of the "Summary of Progress," that the detailed study of the rocks in the North Staffordshire Coal-field has shown that the coal-measures extend over a much wider area at or near the surface than was previously thought. Evidence furnished by a bore-hole at Thurgarton near Nottingham confirms the persistence and importance of the subdivisions that have been recognised and mapped in the North Staffordshire coalfield.

Much new information has also been gathered in the great Coal-field of South Wales, and some remarkable disturbances accompanied by over-thrusting are figured. Interesting also are the observations which have been made on the secondary rocks in this coal-basin. The occurrence of a red and green marl in the upper part of the Rhætic group at Coity, near Bridgend, and onwards to near the famous old Pyle Inn, is significant as showing the local continuation of conditions akin to those of the Keuper Marl in the Rhætic period.

Fossils of Rhætic character have been found in the passage-beds between the Red conglomerates and Lower Lias of Skye. More important still is the discovery of Rhætic fossils in the island of Arran. Here the beds which have yielded the specimens are not actually *in situ*, but are enclosed in a coarse conglomerate that fills a volcanic vent, probably of Tertiary age.

In the accounts of Lower Cretaceous rocks mention is made of fossils obtained from the Sandgate Beds, near Midhurst; and in the records of Tertiary strata there are notices of new fossiliferous localities in the Reading Beds, London Clay, Bagshot Sands, Bracklesham Beds and Barton Clay of Hampshire.

Among the Tertiary igneous rocks of Skye much new information has been obtained. The gabbro is described as consisting of numerous distinct intrusions in the form of wedges, sheets and tongues. In the basalt plateaux west of the Cuillin Hills the salient features of the slopes are due to the numerous hard intrusive sills intercalated among the softer lava flows. These latter are in general amygdaloidal. References are made to other and later sills which differ from those which follow the bedding-planes of the lavas.

Glacial drifts have received much attention in various parts of the country. Perhaps the most interesting result obtained is that having reference to the sequence in the Gower promontory of South Wales. Evidence is given to show that the deposits holding the Pleistocene fauna in the caves are newer than the raised beach, and that these bone-beds are overlain by the glacial drift.

Of special petrographical work the descriptions of the volcanic rocks of the Exeter district are noteworthy. The results of a further examination of olivine-monzonites from Argyllshire are also stated. Analysis is given of a manganese deposit of Culm-measure age at Hockworthy in Devonshire.

Of palaeontological work mention should be made of the detection of phosphatic nodules with traces of probable cell-structure in the Torridonian rocks of Ross-shire. A useful catalogue is also appended of the Eocene and Oligocene type fossils which are preserved in the Museum of Practical Geology.

NOTES.

THE following Fellows of the Royal Society have been recommended by the president and council of the Society for election into the council for the year 1900, at the anniversary meeting on November 30. The names of the new members of the council are in italics. President: *Sir William Huggins, K.C.B.* Treasurer: Mr. A. B. Kempe. Secretaries: Sir Michael Foster, K.C.B., Prof. A. W. Rücker. Foreign Secretary: Dr. T. E. Thorpe, C.B. Other members of the council: *Prof. H. E. Armstrong, Mr. C. V. Boys*, Dr. Horace T. Brown, Mr. W. H. M. Christie, C.B., Prof. E. B. Elliott, Dr. Hans F. Gadow, *Prof. W. M. Hicks*, Lord Lister, *Prof. W. C. McIntosh, Dr. Ludwig Mond*, Prof. A. W. Reinold, *Prof. J. Emerson Reynolds, Dr. R. H. Scott, Prof. C. S. Sherrington*, Mr. J. J. H. Teall, *Sir J. Wolfe Barry, K.C.B.*

THE Royal Society's Medals have this year been adjudicated by the president and council as follows:—the Copley Medal to Prof. Marcellin Berthelot, For. Mem. R.S., for his brilliant services to chemical science; the Rumford Medal to Prof. Antoine Henri Becquerel, for his discoveries in radiation proceeding from uranium; a Royal Medal to Major Percy Alexander MacMahon, F.R.S., for the number and range of his contributions to mathematical science; a Royal Medal to Prof. Alfred Newton, F.R.S., for his eminent contributions to the science of ornithology and the geographical distribution of animals; the Davy Medal to Prof. Guglielmo Koerner, for his brilliant investigations on the position theory of the aromatic compounds; and the Darwin Medal to Prof. Ernst Haeckel, for his long continued and highly important work in zoology, all of which has been inspired by the spirit of Darwinism. Her Majesty the Queen has been graciously pleased to approve of the award of the Royal Medals. The medals will, as usual, be

presented at the anniversary meeting on St. Andrew's Day (November 30). The Society will dine together at the Whitehall Rooms on the evening of the same day.

To commemorate Huxley's anthropological work, the Council of the Anthropological Institute of Great Britain and Ireland has decided to found a public lecture, which will be called the "Huxley Memorial Lecture," and will be given annually at the opening of the winter session of the institute. The first Huxley lecture will be delivered by the Right Hon. Lord Avebury, F.R.S., and is announced for Tuesday, November 13, at 8.30 p.m., in the lecture theatre of the Museum of Practical Geology, Jermyn Street, S.W., which, as the scene of so much of Huxley's most impressive teaching, was felt to be the most appropriate place for such a ceremony, and has been placed for the occasion at the disposal of the Anthropological Institute. Applications for tickets of admission should be addressed to the Secretary, the Anthropological Institute, 3, Hanover Square, W., as early as possible.

MANY aspects of the subject of water supply were considered by Mr. James Mansergh in his presidential address to the Institution of Civil Engineers on Tuesday. First and foremost is the question of rainfall and its accurate registration, as providing the prime factor in ascertaining the capability of supply of any given drainage area, with the flow off watersheds of varying form and geological structure, the losses by evaporation, and the discharge by floods. From the point of view of the water-works engineer, this information is of the highest importance, and has been dealt with by previous presidents of the Institution. On the question of purity, which means, according to the now generally accepted opinion, the absence from the water—as delivered to its consumers—of any pathogenic organisms, the responsibilities of the water engineer are daily becoming more exacting. The best methods of examining and purifying waters for drinking purposes are scientific problems which have not yet been completely answered; and Mr. Mansergh showed in his address that water engineers are awaiting the expression of a definite opinion as to what organisms are actually harmful and what means should be used to remove them.

A PRIVATE conference was held at the Board of Trade last week to consider the protection of the delicate instruments in use at Kew and Greenwich Observatories from magnetic disturbance, through the working of tramways and railways in the metropolis by electricity. Sir Courtenay Boyle presided, and among the officials of the Board of Trade present were Mr. F. J. S. Hopwood, Sir Thomas Blomfield and Mr. Trotter. The observatories and kindred public departments were represented by Mr. Christie (the Astronomer-Royal), Prof. Rücker, Mr. Glazebrook (Director of the National Physical Laboratory), Lieut. Colonel Raban (Director of Works at the Admiralty), Admiral Sir W. J. Wharton (Hydrographer to the Admiralty), and Profs. Ayrton and Perry. Among those who attended as representatives of the railway and tramway interests concerned were Mr. George White (chairman) and Mr. J. Clifton Robinson (engineer) of the London United Tramways Company, Sir Benjamin Baker and Sir W. Preece. The conference is mentioned in Prof. Perry's address, on p. 46 of the present issue.

A METHOD of diminishing the disturbing effects of electric tramways on magnetic observatories forms the subject of a note by M. Th. Moureaux in a recent number of the *Comptes rendus*. The observatory of Parc Saint Maur is at a distance of about 3·2 kilometres from a line of electric trams between Vincennes and Nogent sur Marne, and the disturbances are due chiefly to erratic currents, which exhibit their influence, not in the form of permanent displacements, but in series of vibrations, symmetrical with respect to

the axis of the curves. The effect attains a maximum corresponding apparently to the starting of the cars after stoppages. M. Moureaux recommends as a remedy (1) the use of powerfully magnetised bars of rectangular or square section, (2) the addition of masses of copper with the object of increasing the moment of inertia of the oscillating system, (3) the use of a damper. The author has introduced these modifications into a declinometer and a bifilar magnet, and observations have been made with the new instruments, not only at Parc Saint Maur but also at the forts of Vincennes and Nogent, which are situated in much closer proximity to the tram-line. The general result was a decrease of the disturbing effects of the electric currents to about one-tenth of their former value. It was found that the efficiency of the instruments in recording natural disturbances was in no way impaired by the modifications in question, the records of a small disturbance made with two of the new bifilar instruments at Nogent coinciding in every detail with those taken at Parc Saint Maur.

IN recognition of the services rendered to chemical science by Prof. A. W. Hofmann, new premises have been erected in Berlin for the occupation of the German Chemical Society, and the building has been named "Hofmann Haus." We learn from the *Pharmaceutical Journal* that the formal opening of the building took place on October 20, in the presence of a large number of Government officials and many representatives of the universities and other scientific institutions of Germany. The first step towards the establishment of this memorial was taken in 1888 at the celebration of Hofmann's seventieth birthday, when a sum of 300,000 marks was subscribed for the foundation of an Institute that, besides providing a laboratory for chemical investigation, would serve as a home for scientific societies and a place for meetings, lectures or exhibitions, &c. After Hofmann's death in 1892 the scheme was warmly taken up; the Empress Frederick, who had been a pupil of Hofmann's, supported it by accepting the position of patroness, and with the aid of Dr. J. F. Holtz it has now been successfully carried out, so that the Hofmann Haus could be handed over to Prof. Volhard, the president of the German Chemical Society. The same evening the first meeting was held in the new premises, when addresses were delivered by Prof. v. Beyer of Munich, and Dr. Brunck, the Director of the Badischen Aniline and Soda Factory, describing the synthesis of indigotin and the development of its manufacture at Ludwigshafen.

At a meeting of the Council and Members of the Victoria Institute held on Monday, November 5, the president, Sir George G. Stokes, F.R.S., in the chair, Prof. Edward Hull, F.R.S., was elected secretary of the Institute in succession to the late Captain Francis Petrie.

THE annual course of Christmas lectures, specially adapted to young people, at the Royal Institution, will be delivered by Sir Robert S. Ball, F.R.S., whose subject is "Great Chapters in the Book of Nature." The first lecture will take place on Thursday, December 27, at three o'clock.

A REUTER message from Simla states that since the Pasteur Institute was opened at Kasauli under the direction of Major Semple, seventy-five patients have sought admission, sixty-two of whom completed the course. In no case has the treatment ended in failure, though several of the patients had been bitten on the face by dogs and jackals. Seven British officers, twenty-five soldiers, and twelve European civilians have been treated. The rest of the patients were natives. It is evident that the institute continues to supply a pressing need.

OVERHEAD wires conveying electric currents for tramway traction are certainly unsightly, and an accident which a *Time* correspondent reports from Vienna reminds us of their danger.

A telephone wire which had broken fell upon the overhead wire of the new electric tramway line and made connection with the earth. A lady, who got caught by the loose wire, and three men who went to her assistance, were injured by the current. Two of the persons were so seriously injured that they had to be taken to a hospital, and one is not expected to recover. From the report it is not quite clear how the woman got entangled with the telephone wire, and if the wire coiled round her in falling she might, of course, have been seriously injured, even if no current from the overhead wires of the tramway line had been passing through it. There is danger when a wire breaks, whether the wire comes in contact with one conveying a strong electric current or not. The accident might, however, have been prevented had nets been placed, as is sometimes cautiously employed, over the tramway overhead wires at places where telephone or telegraph wires cross them.

At the Imperial Institute, on Monday, Mr. James Stirling discoursed upon "Golden Victoria, its Scenery, Geological Features, and Mines," and gave a glowing account of its resources. Victoria, although the smallest State in the Australian Continent, is the most varied with regard to its surface features, natural resources, climate, &c. It has produced, during the last half-century, more gold than any other country in the world, California excepted, viz., 256 millions out of the total 413 millions produced by Australasia. Bendigo, the deepest mine, is now 3434 feet in depth. Boring operations have proved that deep auriferous leads of about 400 miles in extent exist in various parts of the Colony. The coalfields cover, in Gippsland alone, 3000 square miles of territory, and the seams are up to 5 feet in thickness. In several valleys, such as the Latrobe, immense deposits of brown coal 276 feet thick have been found.

THE *Times* states that the practicability of utilising Mr. Marconi's system of wireless telegraphy in connection with the mail packets running between Dover and Ostend has just been tested, with satisfactory results. The vessel selected for the demonstrations was the Belgian mail packet, *Princess Clementine*, commanded by Captain Romyn. The installation was fitted up in one of the private deck cabins on the starboard side. The receiving and sending wires were connected to the foremast, the height of which had been considerably increased. The land installation was set up at La Panne, on the flat coast between Ostend and Dunkirk, the mast being about 130 ft. in height. The distance between La Panne and Dover is 61 miles. The *Princess Clementine* left Ostend soon after 11 o'clock on Saturday night and arrived at Dover at 2.40 on Sunday morning. Captain Romyn described the results so far beyond anything which the Belgian authorities had anticipated. A message was transmitted from Ostend to La Panne when the *Princess Clementine* left the Belgian port, and telegrams continued to be exchanged between the vessel and the shore at frequent intervals during the voyage to Dover. The messages were transmitted at the rate of about twenty words a minute. Messages were exchanged right up to the time the vessel reached Dover.

THE *Indian Meteorological Memoirs* (vol. xi. Part II.) contain a discussion of the observations recorded during the solar eclipse of January 22, 1898, at 154 meteorological stations in India, by Mr. J. Eliot, F.R.S. The weather was very fine over India generally, but at some of the more southerly stations the sky was overcast. The cooling effect of the eclipse was marked over the whole area; the maximum decrease of temperature ranged between 8° in the belt of totality to 4° in the extreme north and south, the maximum decrease occurring about twenty minutes later than the maximum obscuration of the sun. The movement of the air was very light generally, and was practically suspended during the greater part of the eclipse, but a noteworthy feature was the occurrence of a short, sudden

gust about twenty minutes after the commencement of the eclipse at the majority of stations in and near the belt of totality. There was a remarkable increase in the amount of aqueous vapour, which commenced about the middle of the eclipse and was followed by an equally rapid decrease. This last feature was the most remarkable and unexpected phenomenon of this eclipse; it was exhibited at all stations, and was most pronounced at stations in the interior, on and near the line of totality. The diurnal variation of pressure was also considerably modified, the decrease of the amplitude averaging about '035 inch.

At the request of the Austrian Ministry of Agriculture, various experiments have been made by Drs. Pernter and Trabert with the view of testing the use of Mr. Stiger's apparatus for dispersing hail-clouds by gun-firing. The apparatus consists of a mortar with a long funnel fixed to the orifice; upon firing a sufficient charge of powder, rings or whirls are formed in the air and can be followed either by their hissing sound or by the particles of smoke carried up with them. The force and durability of the whirls vary with the charge, and with the size of the funnel, but it does not appear from the experiments that a greater altitude than about 400 metres was reached, which is much less than had been previously stated. It does not seem probable, therefore, that unless the hail-clouds are very low that any practical result is likely to be attained. The most that can be said in favour of the process is that while in some cases the formation of hail may have been prevented by the disturbance of equilibrium, hail frequently falls, in spite of frequent firing. The particulars of the experiments will be found in a recent number of the *Meteorologische Zeitschrift*.

DR. GOLDSCHMIDT, of Essen, has recently described a new welding process invented by himself (says *Fielden's Magazine* for October). The heat required is obtained by means of a compound called "Thermit." Metallic oxides, with aluminium, are its constituents, and it has the property of allowing a fusible mass at a high temperature to be quickly and simply produced. Its use in welding pipes and rails is its most interesting application, as, with its aid, rails can be welded immediately and economically and at any place, a melting-pot only being required. The details of the process are stated as follows:—"The melting-pot is filled with tar-oil, an inflammable mixture is added, and a match is used to ignite it. Spoonfuls of 'Thermit' are then added, which immediately ignites and produces temperatures as high as 3000° C. The highly incandescent contents of the pot consist of iron, called aluminothermo-iron, on the top of which floats melted carborundum. An aluminium oxide is then poured on to the part of the rail to be welded, and the work is done so quickly that the melting-pot is cold and can be taken into the hand after being emptied."

SOME interesting observations on dielectric hysteresis have been lately published by M. F. Beaulard in the *Journal de Physique*. With condensers of paraffin and mica, little dissipation of energy by hysteresis was found, but with dielectrine, curves of hysteresis of the well-known forms were obtained. It was found, however, that the area of the curves and therefore the absorption of energy, varied with the period of time in which the cycle was performed, being less for slow than for rapid cycles. All this, the author considers, is explicable on M. Bouty's hypothesis, according to which the electric residue is due to a temporary retardation of the fictive polarisation on the polarising field. It is to be remarked that M. Pellat has rendered Bouty's explanation independent of the notion of fictive polarisation by proving the existence of a real polarisation varying with the time, thus explaining the phenomena observed in the present experiments, without assuming the existence of hysteresis properties in dielectrics analogous to those in magnetised bodies.

IN the *Bulletin* of the Cracow Academy, experiments are described by Constantin Zakrzewski on the electromotive force produced by the motion of a liquid through a silvered glass tube. The tube in question was a capillary tube connecting two large glass vessels half filled with water, and the electrodes terminated in the water at a short distance from the end of the tube. The flow of water was brought about by introducing compressed air into one of the vases. A current of water was always found to be accompanied by an electric current the direction of which depended on the water current, and the electromotive force was found (i) to vary as the difference of pressure at the ends of the tube; (ii) to depend on the distance of the electrodes from the ends of the tube, the effect of increasing this distance in the case of the electrode opposite the entering stream being to decrease the electromotive force. It is suggested that this result confirms the hypothesis of Quincke and Helmholtz, according to which the electromotive force has its origin in a kind of tearing of the layer of contact electricity between the silver and the water. The electromotive force depends on the thickness of the silvering, and decreases when the thickness increases. In the case of a solution of nitrate of silver, the electromotive force vanishes and changes sign when the concentration is equal to $1/3000$ of the normal.

ABOUT three years ago, Dr. Folgheraiter published a description of observations of the "distinct" points and zones in the magnetisation of rocks, and showed that these singularities, of which he had observed a number in the Campagna, were due to lightning discharges. In a recent issue (No. 10) of the *Frammenti concernanti la geofisica dei Pressi di Roma*, the same author gives an account of certain measurements made with the object of determining (1) to what distance the magnetism produced by lightning produces any sensible action; (2) the direction of the magnetising lightning-discharge. The results already arrived at show that in certain singular zones (*zone distinte*) the direction of discharge is determinable, and the magnetic properties and distribution of magnetism resemble those of an ordinary magnet; while in the case of other zones it has been impossible, as yet, to ascertain either the direction of the magnetising discharge or the position of one of the two magnetic poles.

IN a recent number of *Terrestrial Magnetism and Atmospheric Electricity* (v., 2), Mr. William Sutherland puts forward a possible cause of the earth's magnetism and a theory of its variations. The cause suggested is the rotation of the electrostatic field within the earth, as Rowland's experiments have proved that a moving charge of electricity produces a magnetic field analogous to that of a current. If the earth carries round an electrostatic field in its rotation, then it will have the axis of its magnetic field identical with the axis of rotation, which is the chief approximate fact of the earth's magnetism. The actual obliquity of the magnetic to the rotational axis is traced to unsymmetrical magnetic permeability of the earth, which also causes the induction of earth currents, the secular variation of whose tracks is the cause of magnetic secular variation. The theory advanced to account for daily variation is that, under the action of the sun's rays, the oxygen and ozone of the atmosphere become the active substance of a large secondary battery or accumulator, whose alternate charge and discharge are the cause of the daily variations.

THE metamorphic rocks in Eastern Tyrone and Southern Donegal have engaged the attention of Prof. Grenville Cole, who has sought to determine the relative ages and relations of the granites and gneisses (*Trans. Royal Irish Acad.*, vol. xxxi. Part ii. 1900). The oldest recognisable rocks in the two areas are schists foliated by dynamic metamorphism. In Eastern Tyrone, the occasional gneissic character of this schistose series

has probably been induced by the intrusion of a granite magma, while the structures due to dynamic action have usually been lost in the new flow-structures set up. The gneisses, as well as the less altered schists, are traversed by and included in the granite of the Slieve Gallion type, which also cuts an overlying basic igneous series. In Tyrone, the older granitic material has not been exposed, but it appears in Southern Donegal, and there the granitoid gneiss is seen to be intrusive in an amphibolite series. The pure quartz-felspar-muscovite gneiss becomes rich in biotite at the junctions, and receives a foliated structure, which is due to flow and not to pressure-metamorphism. Similar relations have been observed elsewhere among the older metamorphic rocks. The Irish rocks, to which attention is now drawn, may all be of Archæan age, although the schists (termed Dalradian) are probably the oldest now remaining in the district. After referring to Dr. Callaway's researches in Galway, where he showed how gneiss has been formed by the intrusion of granite into a series rich in amphibole, the author remarks that his own observations tend to confirm the opinion that gneisses may be produced by admixture along surfaces of igneous contact, and that in such cases contact-metamorphism occurs upon a regional scale. Too often, however, the contact-phenomena on a broad scale have been removed by denudation from the surface of our granite domes, and we encounter them only in section along the flanks of the igneous mass.

THE official report of the polar expedition of the Duke of the Abruzzi is summarised in the *Times*. The following points are of interest. The *Stella Polare* left Christiania on June 12, and the farthest north point reached by it was $82^{\circ} 4'$. After this the party had left the ship and established themselves on Rudolf Land. The Duke organised short excursions inland, in preparation for the great sledge expedition it was intended to undertake later. During an excursion at Christmas time the Duke and Cagni fell into a crevasse. The result of this was that two fingers of the Duke's left hand were incurably frostbitten, and the terminal joints had to be amputated. The shock of the fall and of the amputation affected the Duke's health so much that the doctor considered he was totally unfit to undertake the command of the expedition over the ice towards the Pole. Captain Cagni started on March 11, with a party consisting of ten officers and men, with numerous dogs and some sledges and kayaks. After nine days' march, during which $43\frac{1}{2}$ miles were made, Cagni, finding the provisions running short, sent back Lieutenant Querini with two men. These three have not been heard of since. On March 31, when the sledge expedition had passed the 83rd parallel, Dr. Cavalli-Molinelli was sent back with two men. This, with two sledges and sixteen dogs, arrived safely at the main camp on April 24, having taken four days longer to return than to go. Cagni, in the meantime, continued his journey with three of the Italian Alpine guides. They were able to increase their speed to $9\frac{1}{2}$ miles per day, and at last they reached Nansen's furthest north, $86^{\circ} 14'$. After a long and careful observation to make sure of this, they passed beyond, and on April 26, 1900, they touched $86^{\circ} 33' N.$ at about $56^{\circ} E.$, when they decided to turn back. No land was in sight, nothing but ice in a state of thaw. Petermann's Land, which Payer believed he saw, did not exist where he stated, otherwise Cagni would have seen it early in his journey. The same is said of King Oscar Land, which would otherwise have been seen on the return march.

WE have received the November number of the *Entomologist's Monthly Magazine*, which contains notes on the occurrence in Britain of several rare Lepidoptera during the past summer.

THE *Transactions* of the Hull Scientific and Field Naturalists' Club for 1900 contain a number of papers and notes dealing with local natural history and antiquities, among which may be

mentioned one by Mr. T. Sheppard on prehistoric man in Holderness.

THE publishers have sent us the third part of Dr. Otto Fischer's elaborate treatise on the walk of man ("Der Gang des Menschen"). This section of the work, which is illustrated with seven plates, is devoted to a review of the scope of the whole investigation, and a summary of the movements of the lower limbs.

IN addition to a note by Mr. R. Hall on the change of plumage in certain birds, the August issue of the *Proceedings* of the Royal Society of Victoria (vol. xii. (n. s.), part I) contains no less than seven papers dealing with various groups of the invertebrate fauna of the colony. Two of these—on Isopod freshwater crustaceans—are by Prof. O. A. Sayce, each containing the description of a new genus. In a paper on the earth-worms of the colony, Prof. Baldwin Spencer has to record two genera and a very large number of species as new to science.

IN the July issue of the *Journal* of the Straits Branch of the Royal Asiatic Society, Dr. R. Hanitsch gives an account of his recent expedition to Mount Kina Balu, British North Borneo, together with a summary of its zoological results. The examination of many of the specimens acquired was undertaken by specialists in England and Calcutta; and among the novelties are a new genus of freshwater fish and one of snakes, as well as two other new species of reptiles and one of batrachians, all these having been described by Mr. G. A. Boulenger. The paper is illustrated by two excellent photographs of Bornean mountain scenery, as well as with two plates of the new reptiles, batrachian and fish. A second paper by Dr. Hanitsch deals with a flying frog of the genus *Rhacophorus*; and Mr. H. N. Ridley contributes a note on the use of the slow loris in Malay medicine.

WITH the commencement of the current volume of the *Botanical Gazette*, Prof. J. C. Arthur has vacated the editorial chair, which he has occupied since 1886. The responsible editors are now Prof. John M. Coulter and Prof. Charles R. Barnes.

WE have received a prospectus of the County School of Horticulture, Chelmsford, established by the Essex County Council, under the direction of Mr. David Houston and Mr. Charles Wakely. Instruction is given in the various branches of scientific horticulture, and certificates of proficiency are awarded. The technical instruction committee offer free instruction, travelling allowance, and, at their discretion, board and lodging, to fifteen pupils from the county of Essex, to be selected from candidates who fulfil the necessary conditions. Scholarships are also awarded, tenable for two years at the gardens of the Royal Horticultural Society, Chiswick, or other gardens approved by the committee.

Now that the new Imperial Agricultural Department is settling down to steady work under Dr. Morris, the issue of the series of publications intended to supply colonial cultivators with the latest information on questions of interest to them is becoming more regular. The fourth number of the *West Indian Bulletin*, which has just reached us, is a double number, of 136 pages, in which Mr. Maxwell-Lefroy, the entomologist to the Department, deals with "Moth Borer in Sugar Cane"; Prof. d'Albuquerque and Mr. Bovell describe "Sugar Cane Experiments at Barbados"; Mr. Scard describes "Some Experiences with Seedling Cane in British Guiana"; the Hon. Francis Watts, "Tree Planting in Antigua" and "Care of Pastures in Antigua"; and Mr. J. H. Hart, "Some Fungi of the Cacao Tree." In addition to these contributions there are others on

"Sugar Cane Experiments in Louisiana"; "The Fixation of Atmospheric Nitrogen by Leguminous Plants"; "Cacao Industry in Grenada"; "Agricultural Education in English Rural Schools," also in French rural schools; and "Fumigation of Seeds and Plants." Some of the articles are suitably illustrated. It is to be hoped that the planters and others in the various islands are making a careful study of the valuable facts thus brought to their notice by the Imperial authorities, and that they are recognising the absolute necessity of introducing more modern scientific methods into their systems of cultivation and preparation of goods for market, otherwise they must inevitably suffer in the keen competition with those who adopt all the latest discoveries of science to aid them in their calling.

WE have received from Prof. Francesco Porro, of Turin, a reprint of a note communicated by him to the *Giornale di Matematica* (Naples: B. Pellerano, February), containing a simple exposition of the problem of the motion of a planet about the sun. The paper is based on the methods adopted in Prof. Porro's university lectures.

THE September number of the *Physical Review* contains a photographure frontispiece of the late Thomas Preston, of whom "E. M." contributes a short biography. It also contains a *résumé* of our knowledge of Becquerel rays, by Mr. Oscar M. Stewart.

M. J. B. BAILLIÈRE ET FILS, Paris, have just published a "Catalogue général de Livres de Science" comprising the titles of books on all branches of physical and natural science. The catalogue contains more than five thousand titles, and reference to its contents is made easy by a detailed index.

MESSRS. ROBERT BOYLE AND SON, LTD., have issued a catalogue of lantern slides for lectures on ventilation, which they are prepared to lend, free of charge. The slides illustrate chiefly the Boyle system of ventilation applied to buildings of various kinds.

AN acetylene generator designed for use with optical lanterns, is included in Messrs. Newton and Co.'s supplementary list of lantern slides for the session 1900-1901. Among the new slides are sets illustrating the methods and results of eclipse observations made by Sir Norman Lockyer's expeditions of 1896 and 1898, Prof. R. W. Wood's photographs of sound waves, and Dr. J. L. Williams's photo-micrographic studies of the morphology and pathology of enamel of teeth.

A NOTEWORTHY characteristic of recent catalogues of many scientific instrument makers is the cheapness and simplicity of a large number of the instruments mentioned and illustrated. The catalogue of electrical apparatus and accessories just issued by Messrs. W. and J. George, Ltd. (late Messrs. F. E. Becker and Co.) is no exception to this commendable feature. Formerly it took years for a good piece of apparatus to find its way into an instrument maker's catalogue, but now the apparatus often becomes available a few months after it has been shown at a scientific society. We notice in the present catalogue, in addition to the usual instruments for lecture-rooms and laboratories, Davidson and Headley's localisers for Röntgen ray work, apparatus for Tesla's experiments with alternating currents of high frequency, and for Hertz wave experiments and wireless telegraphy.

MR. THOMAS MURBY has recently issued new editions of three text-books of science published by him. Prof. Meldola's book on "Inorganic Chemistry," which originally appeared twenty years ago, has been brought more or less into line with the present position of chemical science by Mr. J. Castelli

Evans. The chapter on spectrum analysis might with advantage have been revised by some one familiar with recent work. The statement that "450 of the Fraunhofer lines have been observed to coincide with the lines of the iron spectrum," is, like several others, far behind the times, for more than 2000 coincidences have been photographed. A new edition (the tenth) of Skertchly's "Geology" has been prepared by Dr. James Monckman. A new section on petrology has been added to make the book suitable for the present requirements of the examiners of the Board of Education (South Kensington). A few alterations have been made, but the revision is not entirely satisfactory. For instance, a page is devoted to observations made by Mr. W. J. Henwood in 1871 on the temperatures of mines, although an excellent summary of such observations, containing far more instructive information, was given by Mr. Bennett Brough before the Society of Arts four or five years ago, and might have been used. A table of determinations of the earth's density is given, but it does not contain any of the observations made during the last ten years. Lord Kelvin remains Sir William Thomson; and only his early conclusions, and Helmholtz's, are given concerning the age of the earth. The figures, as well as many of the facts, are old-fashioned, and Dr. Monckman would have done better to have rewritten the book from the point of view of the geologist of to-day instead of attempting to adapt past ideas to present positions. Mr. Frank Rutley's little book on "Mineralogy" has deservedly had a successful career, and the twelfth edition, which Mr. Murby has just published, is a veritable *multum in parvo* as regards information of service to elementary students of mineralogy. Among the changes are the addition of a brief outline of the recently adopted treatment of crystal symmetry, a few figures of crystals, and the revision of the chemical formulæ.

THE additions to the Zoological Society's Gardens during the past week include two Patas Monkeys (*Cercopithecus patas*, ♂ ♀) from West Africa, presented by Mr. E. Jones; a Syrian Bear (*Ursus syriacus*) from Western Asia, presented by Mr. Robert de Rustafjæll; a Peregrine Falcon (*Falco peregrinus*) from Canada, presented by Mr. T. H. Small; an Osprey (*Pandion haliaetus*), captured in the Red Sea, presented by Captain T. Yendell; a Bush Dog (*Icticyon venaticus*, ♀) from Colombia, a Tayra (*Galictis barbara*) from South America, a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, three Wattled Honey-eaters (*Anthochaera carunculata*) from Australia, deposited; a Bosman's Potto (*Perodicticus potto*) from West Africa, a Bouquet's Amazon (*Chrysotis bouqueti*) from Dominica, two Ruddy Sheldrakes (*Tadorna casarca*, ♂ ♀), two Knots (*Tringa canutus*), European, purchased.

OUR ASTRONOMICAL COLUMN.

THE PLANET EROS.—A good opportunity will be offered for detecting this little object on the early evenings of November 10 and 11 before moonrise. The planet will pass near the 5th magnitude star, 4 Persei, the positions of the objects being as follows:—

	R.A.	Decl.
	h. m. s.	° ' "
4 Persei ...	1 55 38 ...	+54 0
Eros, November 10 ...	1 56 53 ...	+54 21
November 11 ...	1 54 51 ...	+54 19

The position for 4 Persei is for 1900. The places of Eros are for Berlin mean midnight, corresponding to G.M.T., 11h. 7m.

On November 10 Eros will be about $\frac{1}{2}^{\circ}$ N.E. of the star, and on November 11 about $\frac{1}{2}^{\circ}$ N.N.W. of the star. The magnitude of the planet will be 9 $\frac{1}{2}$. If the small stars in the region indicated are carefully watched, Eros may soon be identified by his motion.

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EPHEMERIS OF COMET 1900b.—The following is an abridgment from a complete ephemeris communicated by Herr A. Wedemeyer to the *Astronomische Nachrichten* (Bd. 153, No. 3670).

Ephemeris for 12h. Berlin Mean Time.				
1900.	R.A.	Decl.		
	h. m. s.	° ' "		
Nov. 8 ...	15 26 1'69 ...	+66 7 1'6		
10 ...	29 5'06 ...	66 17 18'7		
12 ...	32 10'10 ...	66 29 12'3		
14 ...	35 16'92 ...	66 42 41'4		
16 ...	38 25'58 ...	66 57 45'0		
18 ...	41 36'22 ...	67 14 22'2		
20 ...	44 48'90 ...	67 32 31'9		
22 ...	48 3'70 ...	67 52 12'5		
24 ...	51 20'75 ...	68 13 22'8		
26 ...	54 40'11 ...	68 36 1'5		
28 ...	15 58 1'85 ...	69 0 6'5		
30 ...	16 1 26'23 ...	+69 25 35'9		

NEW VARIABLE STARS.—In the *Astronomische Nachrichten* (Bd. 153, No. 3669), Herr Jos. Hisgen, of the Valkenburg Observatory, announces that he has detected variability in a star in Cygnus having the following provisional position:—

$$\left. \begin{array}{l} \text{R.A.} = 19^{\text{h}} 43^{\text{m}} 19^{\text{s}}. \\ \text{Decl.} = +48^{\circ} 49' 3 \end{array} \right\} (1900 \text{ } ^{\circ})$$

The star reaches the 9th magnitude, and the light changes comprises at least four magnitudes: an approximation to the period is given as about 250 days.

IN the *Astronomische Nachrichten* (Bd. 153, No. 3670), Dr. T. D. Anderson announces the variability of a star in Pegasus, the change of which has hitherto escaped notice. The position is as follows:—

$$\left. \begin{array}{l} \text{R.A.} = 22^{\text{h}} 4' 6^{\text{m}}. \\ \text{Decl.} = +13^{\circ} 38' \end{array} \right\} (1855 \text{ } ^{\circ}).$$

The variation in magnitude is not completely stated, but at its maximum brightness the star is about 9.9 magnitude, while at minimum it was invisible in a 3-inch telescope.

IN the same issue of the above journal, Mr. A. Stanley Williams calls attention to a new variable star in Lyra with the following co-ordinates:—

$$\left. \begin{array}{l} \text{R.A.} = 18^{\text{h}} 32^{\text{m}} 51^{\text{s}}. \\ \text{Decl.} = +43^{\circ} 49' 6 \end{array} \right\} (1855 \text{ } ^{\circ}).$$

The variation of magnitude was determined photographically from plates taken with a portrait lens of 4.4 inches aperture. When at its greatest brightness the star is of about 10.5 magnitude, diminishing to a minimum of below 12 magnitude. A table of successive observations indicates maxima to have occurred about December 31, 1899, and September 3, 1900.

ASTRONOMICAL WORK AT DUNSINK OBSERVATORY.—The ninth volume of astronomical observations and researches at Dunsink, the observatory belonging to Trinity College, Dublin, consists chiefly of a catalogue giving the mean places of 321 stars, furnished by observations made with the meridian circle during 1898-9, under the direction of Prof. C. J. Joly, the Astronomer Royal of Ireland. The instrument has been provided with a new reticle having three sets of five vertical wires instead of five sets as formerly. The actual observations and preparation of the catalogue were done by Mr. C. Martin.

THE LEONID METEORIC SHOWER.

WITH the return of the Leonid epoch we are naturally led to inquire as to the prospect immediately before us. The expectation of preceding years having been grievously disappointed, observers cannot help feeling very dubious as to the return of the meteors. This is accentuated by the fact that computations made under Dr. Downing's directions show that since their return in 1866 the denser part of the stream has been subject to considerable perturbation. At the middle of November 1899 the meteors probably passed about 1 $\frac{1}{2}$ millions of miles inside the earth's orbit, and therefore escaped a rencontre with the earth. At the ensuing approach the conditions appear even less favourable, for the calculations indicate that the swarm will pass us by at a point about 1 $\frac{1}{2}$ millions of miles nearer to